



N F E S C

"Specialized facilities engineering and technology"

Risk-Based Corrective Action (RBCA)

"A cost effective and practical strategy to manage site clean-up"



Leaking underground storage tanks can lead to subsurface contamination.

Naval Facilities Engineering Service Center
1100 23rd Avenue
Port Hueneme, CA 93043-4370

For technical assistance call
1-888-4-THE ESC (1-888-484-3372)
or

visit our Web site at:
<http://www.nfesc.navy.mil>

What is Risk-Based Correction Action (RBCA)?

Risk-Based Corrective Action (RBCA) is a site evaluation process that combines site characterization, risk management, and remedial action into one framework. RBCA allows owners to efficiently screen sites by matching the extent of remediation with the site-specific risk to human health, safety, and the environment.

RBCA has advantages over other traditional methods for site characterization. These include:

- Provides an established basis for negotiation with regulatory agencies.
- Achieves savings for assessment costs by using efficient screening methods.
- Encourages the use of risk-based treatment levels, limiting remediation costs in minor contamination areas.
- Ensures that the most appropriate and cost effective remedy for medium and high contamination areas is selected.

Three tiers of RBCA

The RBCA approach centers around the standards developed by the American Society of Testing and Materials (ASTM). The three-tiered ASTM RBCA process (Figure 1) is designed to efficiently develop risk-based, clean-up standards at the Tier 1 level and, if necessary, incorporate more detailed and site-specific assessment and risk evaluation methods under Tiers 2 and 3.

• **Tier 1 Analysis:** The ASTM Tier analysis provides a conservative screening table for establishing site clean-up standards. The site is classified as either an immediate threat, short-term threat, long-term threat, or no threat based on widely accepted standards.

This analysis is not site specific and can be completed with limited site assessment activities. Tier 2 analysis is used if Tier 1 assumptions are too conservative for specific site conditions.

• **Tier 2 Analysis:** Tier 2 analysis is used if Tier 1 assumptions are too conservative for specific site conditions. To generate site-specific target levels (SSTL), Tier 2 analysis requires more detailed site data than Tier 1. This analysis also uses a more liberal risk model that assumes the receptor is **not** located at the source, but at an alternative exposure boundary downgradient of the hotspot. Alternative boundaries may be property lines, buildings, or other site barriers. If no further action is deemed necessary after the Tier 2 analysis is completed, risk management procedures are established for long-term monitoring of the site.

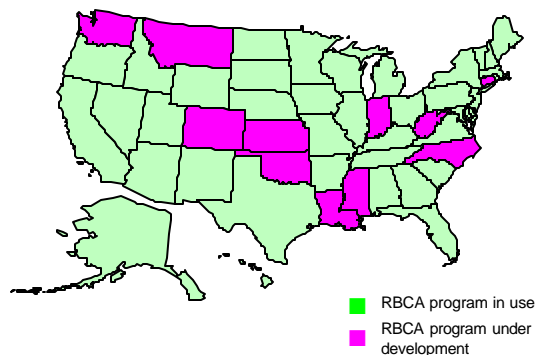
• **Tier 3 Analysis:** If a full risk assessment is necessary to further characterize the site conditions, the process moves to Tier 3. Toxicity information, probabilistic evaluations, and complex fate and transport modeling may be incorporated into the process. Tier 3 provides a comprehensive set of SSTL that can be used to optimize the selection of the remedial method.

State acceptance of RBCA

RBCA programs are currently in place in 39 states and are under development in 11 more. States with RBCA programs are:

Alabama	Maine	Ohio
Alaska	Maryland	Oregon
Arizona	Massachusetts	Pennsylvania
Arkansas	Michigan	Rhode Island
California	Minnesota	South Carolina
Delaware	Missouri	South Dakota
Florida	Nebraska	Tennessee
Georgia	Nevada	Texas
Hawaii	New Hampshire	Utah
Idaho	New Jersey	Vermont
Iowa	New Mexico	Virginia
Illinois	New York	Wyoming
Kentucky	North Dakota	Wisconsin

States with a RBCA Program



The ASTM RBCA process is a recognized standard platform, and each state has used it to set-up their own RBCA program. ASTM E-1739 and ASTM ES-38 are also being adopted by the states.

- **ASTM E 1739** provides an established framework to the RBCA process at petroleum release sites. It provides a basis for the establishment of state RBCA programs.
- **ASTM ES-38** provides for an eight-step process to bring a site through site classification, tier evaluation, corrective action, and finally, to no-further-action.

Common misconceptions about RBCA

- RBCA cleanup levels are less stringent.
- RBCA is not compatible with anti-degradation policies.
- RBCA can be easily manipulated to reduce cleanup requirements.
- RBCA process is very complex.

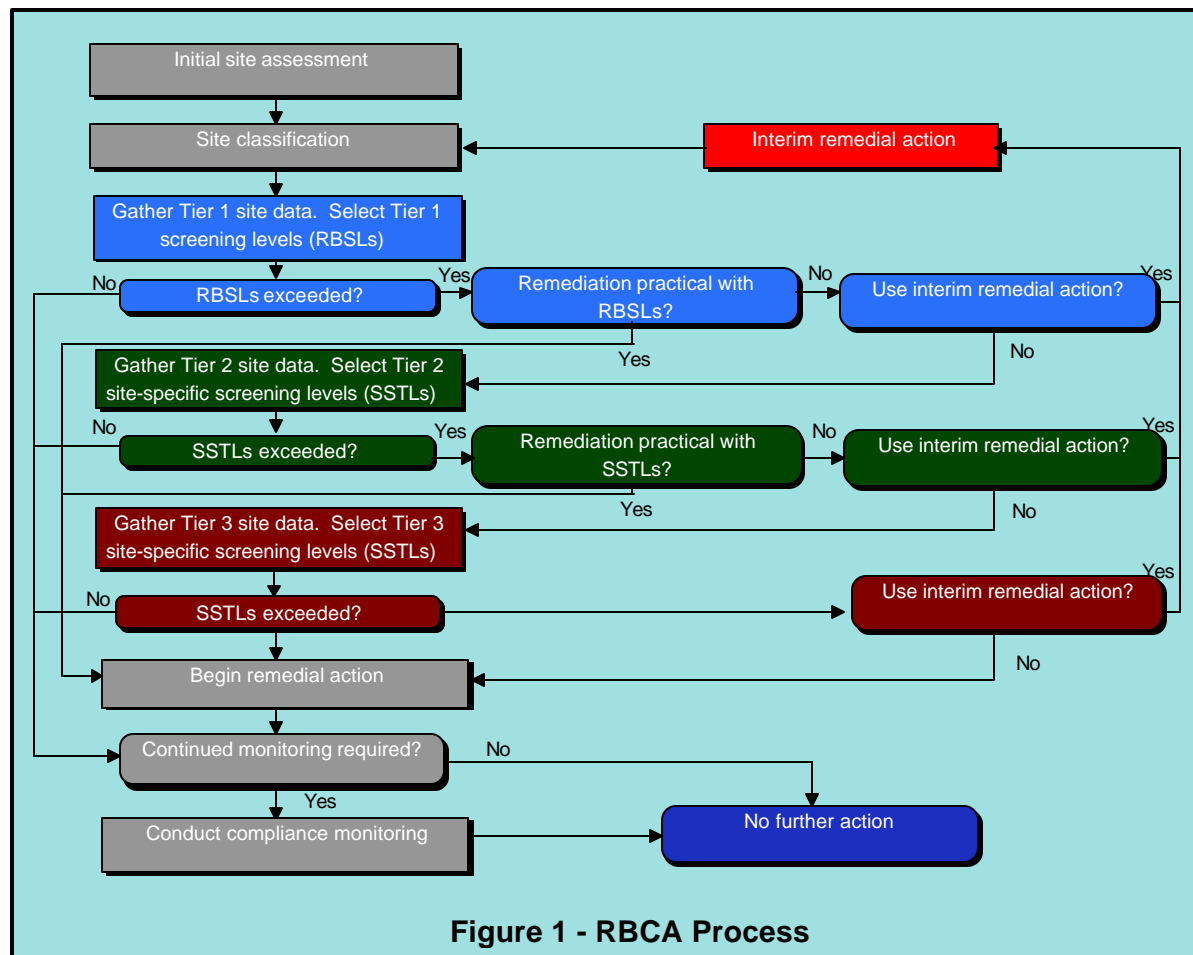


Figure 1 - RBCA Process

Technology Application Team

The NFESC Technology Application Team has the following services available to develop and implement RBCA in the DOD community:

- Technical consultations
- Feasibility analysis
- Technical library
- "How-to" manuals
- Contracting mechanisms

For more information contact:

Ms. Carmen Lebron
Restoration Development Branch,
ESC411
(805) 982-1616; DSN: 551-1616; or
internet: lebronca@nfesc.navy.mil